Noise Technical Report
Redevelopment of 70-Acre Parcel and Land Acquisition

Gillespie Field
El Cajon, San Diego County, California

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Introduction

This Noise Technical Report has been prepared to assess the short- and long-term noise impacts of the proposed project: a redevelopment plan for a 70-acre parcel that includes the acquisition of additional properties. The purpose of this noise analysis is to evaluate the proposed project to assure that noise levels in noise-sensitive areas on and near the project site do not exceed applicable exposure standards.

The proposed project consists of the redevelopment of a 70-acre parcel, previously the El Cajon Speedway, located to the north and west of the intersection of Bradley Avenue and Wing Avenue in the City of El Cajon from non-aviation use to aviation use (as shown in **Figure 1**). This change in land use will allow for the installation of a taxiway, apron, and drainage improvements (approximately 15 acres), and later aviation development by private developers (approximately 55 acres). Future improvements to be completed by private developers may include: rectangular and T-hanger spaces, conventional hangar space, aircraft tie-downs, apron area, automobile parking, aircraft maintenance space, and aviation office and business space. The entire parcel is expected to be developed, including the area presently being used as a mitigation site for San Diego ambrosia (Ambrosia pumila) that was set aside for prior development at the airport. All plants from this area would be transplanted to a suitable receptor site in eastern San Diego County. Drainage ditches along the northern and eastern edges of the 70-acre parcel are part of the existing airport drainage system. The northern ditch is expected to be replaced with a pipe, and paved over. There are no plans for the eastern ditch at this time.

The project also involves the acquisition of property to meet federal safety requirements. Federal Aviation Administration (FAA) regulations indicate that the approach surface of the runways at Gillespie Field should be kept free of all obstructions. Land acquisition is proposed to meet federal safety standards for unobstructed approaches for runways 9L-27R and 17-35. Where land acquisition is not necessary or infeasible, avigation easements to prevent obstructions in the flight surface and to allow for overflights would be acquired.

Two alternative development scenarios are proposed for the redevelopment of the same parcel. Alternative A (Reduced Footprint Alternative) consists of developing 66.9 acres (15 acres apron & taxiway and 51.9 acres aviation development) while preserving 3.1 acres (1.1 acres of San Diego ambrosia with 100-ft softscape buffer of 2 acres). This alternative is shown in **Figure 2**. Alternative A would include the installation of a taxiway, apron, and drainage improvements (approximately 15 acres) and the same type of private development described in the Proposed Project. The acquisition of land and avigation easements would remain unchanged from the Proposed Project. Alternative B (Further Reduced Project Alternative) consists of developing 36.5 acres (15 acres apron, taxiway, and drainage improvements; and 21.5 acres aviation development); while 33.5 acres would remain in existing uses (includes preserving the 1.1 acre ambrosia area). This alternative is shown in **Figure 3**. The acquisition of land and avigation easements would remain unchanged from the Proposed Project.

LEGEND

15 acres (taxiway and other infrastructure improvements)

55 acres of aviation development

***Source*:** County of San Diego.

FIGURE 1
Development of 70-Acre Parcel

LEGEND

15 acres (taxiway and other infrastructure improvements)

55 acres of aviation development

1.1 acre of ambrosia to be preserved

100 ft softscape (2.0 acres)

***Source*:** County of San Diego.

FIGURE 2

Reduced Footprint Development of 70-Acre Parcel with Avoidance of San Diego Ambrosia Area

LEGEND

- 15 acres (taxiway and other infrastructure improvements)
- 55 acres of aviation development
- 1.1 acre of ambrosia to be preserved
- 32.4 acres of aviation designated land to continue with existing uses

***Source*:** County of San Diego.

FIGURE 3

Futher Reduced Footprint Development of 70-Acre Parcel with Continuation of Existing Uses

According to the traffic study by LOS Engineering – the proposed project would generate approximately 1,407 average daily trips. Alternatives A and B would generate fewer motor vehicle trips; approximately 1,327 average daily trips under Alternative A and approximately 550 average daily trips under Alternative B. The project would also result in closure of Airport Drive between Joe Crosson Drive and Wing Avenue. The closure of Airport Drive will not generate new traffic, but will cause a redistribution of existing traffic.

Also, according to draft traffic study by LOS Engineering, there are 11 projects anticipated for development in the project site vicinity that would contribute to future traffic conditions. The cumulative projects included in the traffic study are listed in Table 1, and consist of small single family residential projects in existing residential areas, relocation of a commercial project, and construction of industrial and office space.

Table 1
Cumulative Traffic Projects List

Cumulative Projects	Project Site	Proposed Units
TPM 20862	624 Pepper Drive	3 dwelling units
TPM 20921	1269 Tuttle Lane	3 dwelling units
TPM 20931	560 Pepper Drive	3 dwelling units
TPM 20782	Access from Almond Road	4 dwelling units
TPM 20821	Access from Golden Ridge Road	2 dwelling units
TPM 20837	Access from Golden Ridge Road	3 dwelling units
TPM 20895	1103 Topper Lane	4 dwelling units
TPM 20988	8428 Poinciana Drive	4 dwelling units
TPM 20825	2040 Marlinda Way	2 dwelling units
Home Depot Relocation	North Magnolia Avenue and Fletcher Parkway	Relocation and increase of commercial space
Forest Creek Industrial Park	Cuyamaca Street and Prospect Avenue	Construction of R&D/manufacturing, warehouse, and office space

Source: LOS Engineering, 2006.

Characteristics of Sound and Environmental Noise

Sound is created when vibrating objects produce pressure variations that move rapidly outward into the surrounding air. The main characteristics of these air pressure waves are amplitude, which we experience as a sound's "loudness" and frequency, which we experience as a sound's "pitch." The standard unit of sound amplitude is the decibel (dB), and is a measure of the physical magnitude of the pressure variations relative to the human threshold of perception. The human ear's sensitivity to sound amplitude is frequency-dependent, so a modification is usually made to the intensity level in each frequency band. The A-weighted decibel scale provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The units for sound levels that have this so called A-weighting are often abbreviated as dBA. **Table 2** lists the A-weighted average sound levels commonly encountered in various environmental situations.

Table 2
Representative Environmental Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock Band
Jet Fly-over at 100 feet		
	—100—	
Gas Lawnmower at 3 feet		
	—90—	
		Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	
		Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
		Theater, Large Conference Room
Quiet Urban Area during Nighttime	—40—	(background)
Quiet Suburban Area during Nighttime		
	—30—	Library
		Bedroom at Night, Concert Hall
Quiet Rural Area during Nighttime		(background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

Source: California Department of Transportation, *Technical Noise Supplement*, October 1998

Noise is the term generally given to the "unwanted" aspects of intrusive sound. Many factors influence how a sound is perceived and whether or not it is considered annoying to a listener. These include not only the physical characteristics of a sound, but also non-acoustic factors that influence the judgment of listeners regarding the "unwantedness" of a sound, the most important of which are presented in **Table 3**. Excessive noise can negatively affect the physiological or psychological well-being of individuals or communities.

Table 3
Factors that Affect Individual Judgment of a Sound's "Noisiness"

Primary Acoustic Factors
Sound Level
Sound Frequency
Sound Duration
Secondary Acoustic Factors
Frequency Characteristics of the Sound
Fluctuations in Sound Level
Fluctuations in Sound Frequency
Rise-Time of the Sound (e.g., Is it "fast" like an automobile horn, or "slow" like an approaching train?)
Localization of Sound Source (Is it obvious where the sound is coming from, or not?)
Non-Acoustic Factors
Physiology of the Listener (Is the listener's hearing ability acute, or not?)
Listener's Adaptation from Past Experience (e.g., How long has the listener lived near the airport?)
Listener's Activity During Exposure (Was the listener sleeping, working, etc.?)
Predictability of When the Sound Will Occur (e.g., Is it an expected noon-time whistle or a random car horn)
Listener's Judgment of Personal Benefit from Activity Producing the Sound (e.g., Has the repair work being done on a street been long requested by local residents?)
Individual Differences and Personalities

Source: Adapted from *Handbook of Noise Control*, Cyril M. Harris, 1979.

All quantitative descriptors used to measure environmental noise exposure recognize the strong correlation between the high acoustical energy content of a sound (i.e., its loudness and duration) and the disruptive effect it is likely to have as noise. Because environmental noise fluctuates over time, most such descriptors average the sound level over the time of exposure, and some add "penalties" during the times of day when intrusive sounds would be more disruptive to listeners. The descriptors used in this analysis are defined as follows:

- **Leq**, the equivalent energy noise level, is the constant noise level that would deliver the same acoustic energy to the ear as the actual time-varying noise over the same exposure time. Leq would be the same regardless of the time of day during which the noise occurs.

- **Ldn**, the day-night average noise level, is a 24-hour average Leq with a 10 dBA "penalty" added to noise during the hours of 10:00 PM to 7:00 AM to account for increased nighttime noise sensitivity. Because of this penalty, the Ldn would always be higher than its corresponding 24-hour Leq (e.g., a constant 60 dBA noise over 24 hours would have a 60 dBA Leq, but a 66.4 dBA Ldn).

- **CNEL**, the community noise equivalent level, is an Ldn with an additional 5 dBA "penalty" for the evening hours between 7:00 PM and 10:00 PM.

Community noise exposures are most often represented by 24-hour descriptors, such as Ldn or CNEL. One-hour and shorter-period descriptors are useful for characterizing noise caused by short-term activities, such as the operation of construction equipment. Community noise environments are generally perceived as "quiet" when the Ldn/CNEL is below 45 dBA, "moderate" in the 45 to 60 dBA range, and "loud" above 60 dBA. Very noisy urban residential areas are usually around 70 dBA Ldn/CNEL. Along major roadways, noise levels are typically between 65 and 75 dBA Ldn/CNEL.

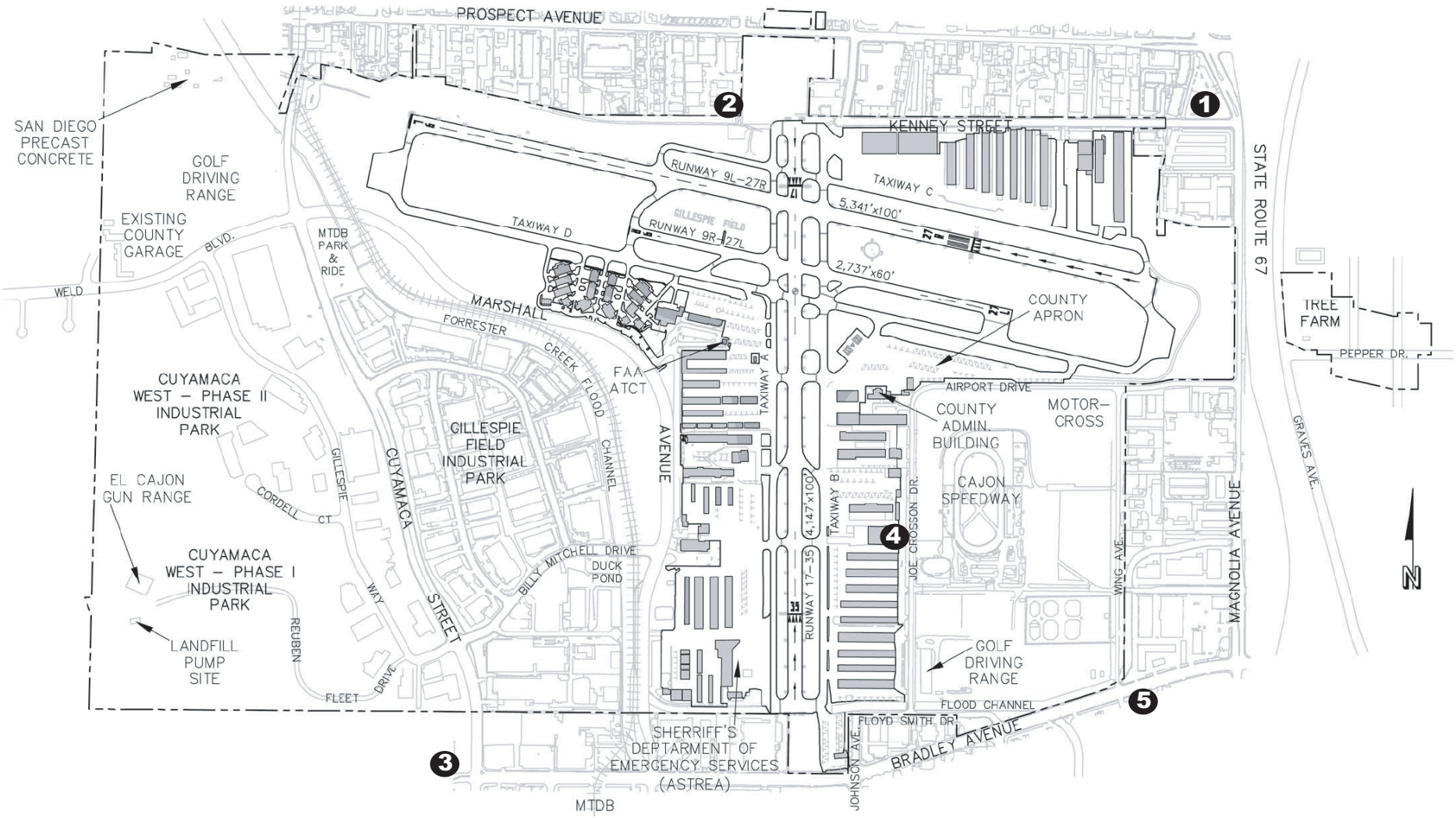
In outdoor environments where the dominant noise sources are transportation-related (i.e., on-road motor vehicles, aircraft, etc.), there are fairly strong relationships among the above-mentioned descriptors: Ldn is about 2 dBA less than peak-daytime hourly Leq (according to *Transit Noise and Vibration Impact Assessment*, Federal Transit Administration, April 1995) and Ldn and CNEL vary by less than 1 dB and are often used interchangeably (according to *Acoustics*, Charles M. Salter Associates, 1998)

Existing Noise Environment

Land parcels adjacent to the airport contain existing industrial and residential uses to the north (along Prospect Avenue), industrial and commercial uses to the east (along Magnolia Avenue) and to the south (along Bradley Avenue). Within the industrially and commercially zoned areas, there are two churches, Foothills Christian Church along Bradley Avenue and the Celebration of Faith Lutheran Church along Magnolia Avenue, both of which would be considered noise-sensitive uses. Airport-related industrial and commercial uses are located to the west of the airport. Further west and southwest of airport property, residential and other noise sensitive land uses predominate. Further east of the airport, across State Route 67, are residential uses.

Although other noise sources occur in the vicinity of the project site, aircraft operations and vehicular traffic are the primary sources of noise on, and near, the project site. Existing daytime noise levels were monitored at five locations near the project site and the surrounding vicinity on April 19, 2006 as shown in **Figure 4**. The monitoring locations represent the noise levels experienced near the airport for the existing sensitive land uses. Sensitive land uses surrounding the project site include churches, a school, and residential land uses. Noise levels were monitored using a Larson-Davis Laboratories Model 720 sound level meter, which satisfies the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. The sources responsible for the measured noise and measurement data at each location are presented in **Table 4**.

Existing peak hour traffic Leqs at local noise-sensitive land uses adjacent to roadways that would be used by people traveling to and from the project site were estimated using the Federal Highway Administration's Traffic Noise Model (TNM). This model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. TNM was also calibrated to better account for on- and near-site conditions by using traffic counts performed concurrently with the noise measurements. The existing peak-hour traffic Leqs were calculated using peak-hour traffic volumes provided by LOS Engineering. The estimated existing peak-hour Leqs at the selected local noise-sensitive land uses are presented in **Table 5.**



***Source*:** P&D Aviation, 2005.

FIGURE 4
Noise Monitoring Locations

Although motor vehicle traffic was found to have the primary influence on noise levels near roadways in the project site vicinity, noise from aircraft using Gillespie Field cannot be ignored as a contributor to total noise levels near these roadways or as the dominant influence in areas more distant from the roadways. The *Gillespie Field Airport Layout Plan Update* (P&D Aviation, September 2005) contains a CNEL contour map showing the 60, 65, and 70 dBA levels for Year 2000 (see **Figure 5**); this was used to define existing aircraft noise levels at the noise-sensitive locations in the project site vicinity that were chosen for TNM modeling.

Table 4
Daytime Noise Levels Measurements at Selected Locations On/Around the Project Site

Noise Measurement Location/Time		Noise Sources	Noise Level Statistics		
			Leq	Lmin	Lmax
#1	Celebration of Faith Lutheran Church, 260 feet from Magnolia Avenue, between Kenney Street and Prospect Avenue. Start time: 10:35 AM.	Primary: Vehicular traffic on Magnolia Avenue and in commercial parking lot. Secondary: Aircraft operations, including regular landings along the adjacent north-south runway.	60.7	49.5	73.5
#2	Town & Country Mobile Lodge, 10250 Prospect Avenue, 50 feet from Prospect Avenue near intersection with Cottonwood Avenue, near end of north-south runway. Start time: 11:15 AM.	Primary: Vehicular traffic on Prospect Avenue. Secondary: Aircraft operations and industrial activities from adjacent uses.	64.5	49.1	79.7
#3	Chaparral High School, 215 feet from Cuyamaca Street near intersection with Bradley Avenue, and Swift Lane. Start time: 12:00 PM.	Primary: Vehicular traffic on Cuyamaca Street. Secondary: Aircraft operations and light rail operations.	59.5	50.1	70.1
#4	Parking lot in front of existing aviation uses along Joe Crosson Drive, west side 15 feet from curb, across from project site. Start time: 12:45 PM.	Primary: Vehicular traffic on Joe Crosson Drive. Secondary: Aircraft operations, including regular take-offs and landings along the east-west runway.	56.4	46.5	76.8
#5	Foothills Christian Church, 75 feet from Bradley Avenue south of intersection with Wing Avenue. Start time: 1:15 PM.	Primary: Vehicular traffic on Bradley Avenue. Secondary: Aircraft operations and construction activities at the lot adjacent to the existing church (construction is for new church facilities).	66.8	50.8	90.5

Source: EIP Associates, 2007.

Measurements were made on April 19, 2006. Each measurement was 10 minutes in duration

Leq is the average noise level over the measurement period, Lmin is the minimum instantaneous noise level measured during the 10-minute period, while Lmax is the maximum instantaneous noise level measured during the 10-minute period.

***Source*:** P&D Aviation, 2005.

FIGURE 5
Existing Noise Contours (CNEL)

Table 5
Existing Roadway Noise Levels at Selected Noise-Sensitive Locations

Roadway	Roadway Segment	Noise Sensitive Uses	Peak Hour Leq (dBA)
Bradley Avenue	East of Wing Avenue	Church	66.4
Bradley Avenue	West of Wing Avenue	Church	66.3
Magnolia Avenue	North of Kenney Street	Church	58.1
Bradley Avenue	East of SR67 interchange	Residential	69.8

Source: EIP Associates, 2007.

Notes: Noise levels calculated with TNM for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setbacks, so noise levels were calculated at an average setback 50 feet from the center of the roadway.

Regulatory Framework

Federal

The Federal Aviation Administration (FAA) Aviation Regulations Part 150 Airport Noise Compatibility Planning Programs include a noise and land use compatibility chart to be used for land use planning with respect to aircraft noise; this chart is included below as **Figure 6**. The FAA guidelines offer recommendations to local authorities for determining the compatibility of various land uses with aircraft-induced noise (using Ldn as the descriptor of exposure) and they specify requirements for additional acoustic insulation for buildings in areas where the aircraft-induced Ldn exceed specified levels. FAA guidelines do not recommend restrictions on locating new residential uses or churches outside a 65 dBA Ldn contour, nor do they recommend additional acoustic insulation. Additional acoustic insulation would be recommended if new residential uses or churches were inside a 65 dBA Ldn contour.

The Federal Transit Administration (FTA) has no mandatory oversight responsibilities for the proposed project or for aviation-related projects in general. However, the FTA has developed extensive methodologies and significance criteria for the evaluation of noise impacts from surface transportation modes. These have applicability to noise from motor vehicle traffic that the proposed project would generate and as to how it might be judged in relation to the existing and future aircraft noise background. The FTA incremental noise impact criteria are presented in **Table 6**.

Land Use	Yearly Day - Night Average Sound Level (Ldn) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodging	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Numbers in parenthesis refer to notes.
*The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable underFederal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise

TABLE KEY

SLUCM Standard Land Use Coding Manual.
Y (YES) Land Use and related structures compatible without restrictions.
N (No) Land Use and related structures are not compatible and should be prohibited.
NLR Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35 Land use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of the structure.

NOTES

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildingswhere the public is received, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

***Source*:** P&D Aviation, 2005.

FIGURE 6
FAA Part 150 Noise Compatibility

Table 6
Noise Impact Criteria for Noise-Sensitive Uses (dBA)

	For Land Use Categories 1 & 2			For Land Use Category 3		
Existing Noise Level	**Project Impact Threshold**	**Combined Noise Level**	**Allowable Noise Increment**	**Project Impact Threshold**	**Combined Noise Level**	**Allowable Noise Increment**
55	55	58	3	60	61	6
60	58	62	2	63	65	5
65	61	66	1	66	68	3
70	64	71	1	69	73	3
75	65	75	0	70	76	1

Source: Transit Noise Impact and Vibration Assessment, Federal Transit Administration, May 2006.
Notes:
Land Use Category 1: Tracts of land where quiet is an essential element in their intended purposes. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor uses. Also included are recording studios and concert halls. The noise metric for Category 1 is the outdoor L_{eq} during the noisiest hour of activity.
Land Use Category 2: Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance. The noise metric for Category 2 is the outdoor L_{dn}.
Land Use Category 3: Institutional land uses with primarily daytime and evening uses. This category includes schools, libraries, theaters, churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered in this category. Certain historical sites and parks are also included. The noise metric for Category 3 is the outdoor L_{eq} during the noisiest hour of activity.

San Diego County General Plan

The Noise Element of the San Diego County General Plan acknowledges that "the most appropriate basic unit of measure for community noise" is the dBA, that "the most appropriate unit of measure for the cumulative effects of community noise" is CNEL, and that "the level of noise acceptable to a reasonable person residing in the vicinity of an airport is established [by the State of California] as a community noise equivalent level (CNEL) value of 65 dB."

The San Diego County Noise Element also contains Policy 4b that establishes the following requirements:

"Because exterior community noise equivalent levels (CNEL) above 55 to 60 decibels and/or interior CNEL levels above 45 decibels may have an adverse effect on public health and welfare, it is the policy of the County of San Diego that:

1. *"Whenever possible, development in San Diego County should be planned and constructed so that noise sensitive areas are not subject to noise in excess of CNEL equal to 55 decibels.*

2. *"Whenever it appears that new development will result in any (existing or future) noise sensitive area being subjected to noise levels of CNEL equal to 60 decibels or greater, an acoustical study should be required.*

3. *"If the acoustical study shows that noise levels at any noise sensitive area will exceed CNEL equal to 60 decibels, the development should not be approved unless the following findings are made:*

    A. *Modifications to the development have been or will be made which reduce the exterior noise level below CNEL equal to 60 decibels; or*

    B. *If with current noise abatement technology it is infeasible to reduce exterior CNEL to 60 decibels, then modifications to the development have been or will be made which reduce interior noise below CNEL equal to 45 decibels. Particular attention shall be given to noise sensitive interior spaces such as bedrooms. And,*

    C. *If finding "B" above is made, a further finding is made that there are specifically identified overriding social or economic considerations which warrant approval of the development without modification as described in "A" above.*

4. *"If the acoustical study shows that noise levels at any noise sensitive area will exceed CNEL equal to 75 decibels, the development should not be approved".*

Though it appears that San Diego County imposes a more stringent exterior noise exposure standard on noise-sensitive land uses than the FAA (i.e., 60 dBA CNEL versus 65 Ldn, respectively), their requirements for maximum interior levels not to exceed 45 dBA CNEL/ Ldn are essentially equivalent.

San Diego County Municipal Code

San Diego County has also adopted a Noise Ordinance (Chapter 4, Noise Abatement and Control, of the San Diego County Municipal Code), which identifies exterior noise standards, specific noise restrictions, exemptions, and variances for sources of noise within the County. The exterior noise standards established in the County's Noise Ordinance are identified in **Table 7**, along with the exterior noise levels that are prohibited. The Noise Ordinance exempts noise emanating from aircraft operations from these standards. However, all noise emanating from airport activities other than that produced by aircraft are subject to the noise ordinance limits.

The Noise Ordinance exempts noise sources associated with construction activities from the County's noise standards except between the hours of 7:00 PM and 7:00 AM, Monday through Saturday. Construction activities are prohibited at any time on Sundays or federal holidays, except during the hours of 10:00 AM and 5:00 PM, provided that the noise level does not exceed 75 dBA for more than eight hours during any 24-hour period, when measured at any property that is developed or used for residential purposes.

Table 7
San Diego County Noise Ordinance Exterior Noise Standards

Zone	Limit One-Hour dBA	Time Period
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U Use Regulations with a density of less than 11 dwelling units per acre.	50 dBA	7:00 AM – 10:00 PM
	45 dBA	10:00 PM – 7:00 AM
R-RO, R-C, R-M, C-30, S-86, RV AND R-U Use Regulations with a density of 11 or more dwelling units per acre.	55 dBA	7:00 AM – 10:00 PM
	50 dBA	10:00 PM – 7:00 AM
S-94 and all other commercial zones.	60 dBA	7:00 AM – 10:00 PM
	55 dBA	10:00 PM – 7:00 AM
M-50, M-52, M-54	70 dBA	Anytime
S-82, M-58, and all other industrial zones.	75 dBA	Anytime

Source: San Diego County Municipal Code.

City of El Cajon Municipal Code

The City of El Cajon Municipal Code limits noise at property lines to levels that range from a maximum of 75 dBA in industrially zoned properties to a maximum of 50 dBA in low density residential areas. However, it exempts noise from rail, aircraft, street or highway transportation, or temporary construction work from these limits.

Project Impacts and Mitigation

Methodology

The analysis in this section focuses on the nature and magnitude of the change in the noise environment due to implementation of the proposed project. The primary sources of noise associated with the project would be new vehicle trips to and from the project site. Other sources of noise would be the operational activities within the project site, including aircraft operation and maintenance. Noise levels associated with on-site activities are identified and compared with the applicable standards to determine whether substantial permanent increases in ambient noise levels would occur. Future noise levels for the roadways that are utilized by vehicles traveling to and from the project site are calculated using TNM and compared with standards of significance to determine whether substantial permanent increases in ambient noise levels would occur.

This analysis uses the following FTA incremental traffic noise impact criteria, which become progressively more stringent as the baseline ambient noise levels increase. Thus, these criteria are more protective of communities with a baseline noise exposure that is already high. As shown in **Table 6**, if the baseline noise level is less than 60 dBA for an FTA Category 2 (e.g., residential) land use, a permanent increase in noise levels of 3 dBA would be necessary before an impact would be considered significant. However, if the baseline noise level is between 65 dBA and 70 dBA, a permanent increase in noise levels of only 1 dBA would be necessary before an impact would be

considered significant. FTA methodology also requires the use of different noise descriptors to determine noise impact significance for the residential uses and churches identified in the project site vicinity; Ldn must be used for residences, while peak-hour Leq is more appropriate for churches.

Traffic Noise Impacts

The increase in traffic associated with implementation of the proposed project would result in increased ambient noise levels at the existing sensitive off-site locations in the project vicinity. **Table 8** identifies the changes in future noise levels along the study-area roadway segments in the project vicinity that have residential uses.

As shown in **Table 8**, implementation of the proposed project would increase noise levels above existing noise levels by a maximum of 0.5 dBA along Bradley Avenue. This increase would not exceed the identified threshold of significance. Noise level increases due to Alternatives A and B would be less than those identified for the proposed project, as these alternatives would generate less motor vehicle trips. Therefore, noise impacts from Alternatives A and B would also be less than significant.

Table 8
Predicted Roadway Noise Levels at Selected Locations with Proposed Project

		Noise Levels (dBA)			
Roadway	Existing Uses	Existing	Existing + Project	Increase	Significance threshold
Bradley Avenue, east of Wing Avenue	Church	66.4	66.7	0.3	3.0
Bradley Avenue, west of Wing Avenue	Church	66.3	66.8	0.5	3.0
Magnolia Avenue, north of Kenny Street	Church	58.1	58.2	0.1	6.0
Bradley Avenue, east of SR67 interchange	Residential	67.8	67.9	0.1	1.0

Source: EIP Associates, 2007.

Notes: Peak hour noise levels were calculated for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setback, so the Ldn noise levels were calculated at 50 feet from the center of the roadway.

Cumulative Impacts. Eleven cumulative projects (as listed in Table 1) were identified by LOS Engineering and were included in the traffic analysis. As shown in **Table 9**, traffic added by the cumulative projects (without the proposed project) would not result in a noise level increase greater than 0.1 dBA over existing conditions. In addition, the cumulative plus proposed project would be considered less than significant because the project would not result in a noise level increase above the identified threshold of significance.

Table 9
Predicted Roadway Noise Levels at Selected Locations with Cumulative Projects and the Proposed Project

Roadway	Existing Uses	Noise Levels (dBA)				
		Existing	Cumulative	Cumulative + Project	Total Increase over Existing	Significance threshold
Bradley Avenue, east of Wing Avenue	Church	66.4	66.6	66.9	0.5	3.0
Bradley Avenue, west of Wing Avenue	Church	66.3	66.4	66.9	0.6	3.0
Magnolia Avenue, north of Kenny Street	Church	58.1	58.2	58.3	0.2	6.0
Bradley Avenue, east of SR67 interchange	Residential	67.8	67.9	68.0	0.2	1.0

Source: EIP Associates, 2007.

Notes: Peak hour noise levels were calculated for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setback, so the Ldn noise levels were calculated at 50 feet from the center of the roadway.

As shown in **Table 10**, under future Buildout conditions (year 2030), the future noise levels would increase above existing by a maximum of 1.1 dBA, but the proposed project's contribution to this increase would be 0.1 dBA. Neither the total increase in noise levels nor the proposed project's contribution to these cumulative increases would exceed the identified significance thresholds. Noise level increases due to Alternatives A and B would be less than those identified for the proposed project, as these alternatives would generate less motor vehicle trips. Therefore, cumulative noise impacts from Alternatives A and B would also be less than significant.

Combined Traffic and Aircraft Noise Impacts

Although motor vehicle traffic is the primary influence on noise levels near roadways in the project site vicinity, noise from aircraft using Gillespie Field also contributes to total noise levels in the project vicinity. Noise exposure from aircraft operations at Gillespie Field includes noise associated with take-offs and landings of aircraft based at the airfield. The *Gillespie Field Airport Layout Plan Update* (P&D Aviation, September 2005) identified an increase in the number of aircraft that would be operating out of the airfield in 2025, based on forecasted demand. The Plan included an updated CNEL contour map showing the 60, 65, and 70 dBA levels for Year 2025 (see **Figure 7**); this was used to define future aircraft noise levels at the noise-sensitive locations in the project vicinity.

***Source*:** P&D Aviation, 2005.

FIGURE 7
Future (2025) Noise Contours (CNEL)

Table 10
Predicted Roadway Noise Levels at Selected Locations with Buildout Traffic Growth (2030)

		Noise Levels (dBA)					
Roadway	**Existing Uses**	**Existing**	**Buildout 2030 [a]**	**Buildout 2030 + Project**	**Total Increase over Existing**	**Project Increase over Buildout 2030**	**Significance threshold**
Bradley Avenue, east of Wing Avenue	Church	66.4	67.3	67.4	1.0	0.1	3.0
Bradley Avenue, west of Wing Avenue	Church	66.3	66.5	66.5	0.2	0.2	3.0
Magnolia Avenue, north of Kenny Street	Church	58.1	59.1	59.2	1.1	0.1	6.0
Bradley Avenue, east of SR67 interchange	Residential	67.8	68.3	68.3	0.5	0.0	1.0

Source: EIP Associates, 2007.

Notes: Peak hour noise levels were calculated for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setback, so the Ldn noise levels were calculated at 50 feet from the center of the roadway.

a. The traffic baseline (year 2030) was developed by LOS engineering using the SANDAG 2030 forecast.

Existing noise levels in the project vicinity are a combination of traffic and aircraft noise levels. Traffic noise levels and aircraft noise levels are combined by adding the two noise levels using the rule for decibel addition.[1] **Table 11** shows the existing noise levels at the selected locations based on the existing traffic and aircraft noise levels, and **Table 12** shows the Buildout 2030 + project noise levels at the selected locations based on the future traffic and aircraft noise levels.

A comparison of the existing combined noise exposure to the future combined noise exposure is presented in **Table 13**. The combined increase shows the cumulative effects of the future traffic level increases and aircraft operations on the sensitive receptors. Noise level increases would be greatest at the church on Bradley Avenue, east of Wing Avenue (i.e., 0.8 dBA). As shown in **Table 10**, the project's traffic contributes only 0.1 dBA to the total 0.8 dBA noise level increase. Neither the total noise level increase nor the project's increment resulting from long-term future growth in traffic and aircraft activity would be significant under FTA criteria. Thus, the project would not contribute considerably, nor would any other local project, to the long-term growth in total ambient noise levels. Therefore, the project would not have a significant cumulative noise impact.

[1] Noise levels were combined using the following formula where Lc = combined noise levels, Lt = traffic noise level, and La = aircraft noise levels
$Lc = 10\log[10^{(Lt/10)}+10^{(La/10)}]$

Table 11
Combined Roadway and Aircraft Noise Levels at Selected Locations (2006)

Roadway	Existing Uses	Noise Levels (dBA)		
		Traffic Noise Levels[a]	Aircraft Noise Levels[b]	Combined Noise Level
Bradley Avenue, east of Wing Avenue	Church	66.4	62	67.7
Bradley Avenue, west of Wing Avenue	Church	66.3	62	67.7
Magnolia Avenue, north of Kenny Street	Church	58.1	62	63.5
Bradley Avenue, east of SR67 interchange	Residential	67.8	59	68.3

Source: EIP Associates, 2006.

Notes:

a. Peak hour noise levels were calculated for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setback, so the Ldn noise levels were calculated at 50 feet from the center of the roadway.

b. Locations outside the 60 dBA CNEL contour were conservatively estimated to be have an aircraft-produced noise level of 59 dBA CNEL and a peak hour aircraft-produced Leq of 62 dBA.

Table 12
Roadway and Aircraft Noise Levels at Selected Locations (2030)[a]

Roadway	Existing Uses	Noise Levels (dBA)		
		Traffic Noise Levels Buildout 2030 + Project[b]	Aircraft Noise Levels (2025)[c]	Combined Noise Exposure
Bradley Avenue, east of Wing Avenue	Church	67.4	62	68.5
Bradley Avenue, west of Wing Avenue	Church	66.5	62	67.8
Magnolia Avenue, north of Kenny Street	Church	59.2	62	63.8
Bradley Avenue, east of SR67 interchange	Residential	68.3	59	68.7

Source: EIP Associates, 2006.

Notes:

a. Peak hour noise levels for traffic were projected using SANDAG's forecast model for the year 2030. Aircraft noise CNEL levels were projected from the ALP forecast for the year 2025.

b. Peak hour noise levels calculated for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setback, so the Ldn noise levels were calculated at 50 feet from the center of the roadway.

c. Locations outside the 60 dBA CNEL contour were conservatively estimated to be have an aircraft-produced noise level of 59 dBA CNEL and a peak hour aircraft-produced Leq of 62 dBA.

Table 13
Combined Roadway and Aircraft Noise Levels at Selected Locations (2030)

Roadway	Existing Uses	Noise Levels (dBA) Existing Combined Noise Level (2006)	Buildout Combined Noise Level (2030)	Combined Increase	Significance threshold
Bradley Avenue, east of Wing Avenue	Church	67.7	68.5	0.8	3.0
Bradley Avenue, west of Wing Avenue	Church	67.7	67.8	0.1	3.0
Magnolia Avenue, north of Kenny Street	Church	63.5	63.8	0.3	5.0
Bradley Avenue, east of SR67 interchange	Residential	68.3	68.7	0.4	1.0

Source: EIP Associates, 2006.
Notes: Noise levels calculated for building setbacks for the church receptors. The residential neighborhood east of the SR67 interchange had varying setback, so noise levels were calculated at 50 feet from the center of the roadway.

Stationary Source Impacts

Construction. The proposed project could involve construction activities associated with development of the 70-acre parcel. Construction activities could include ground clearing, site grading, and construction of structures for the proposed aviation uses. The construction activities associated with each stage would involve the use of heavy equipment. Construction activities would also involve the use of smaller power tools, generators, and other equipment that are sources of noise. During each stage of construction there would be a different mix of equipment operating, and noise levels would vary based on the amount of equipment in operation and the location of the activity.

The proposed project would involve a land use change that would allow for later development by private developers; however, private developers will be responsible for completing the environmental review necessary for approval of their projects. During environmental review of future projects, the nature of construction activities will be more clearly defined. This analysis presents noise levels associated with general construction activities that may occur at the site, and the predicted noise level increases that could occur at a nearby receptor.

As construction activities would primarily occur on the 70-acre parcel identified for development, the closest sensitive receptor would be Foothills Christian Church, approximately 200 feet from the project site across Bradley Avenue.

The United States Environmental Protection Agency (EPA) has compiled data regarding the noise generating characteristics of typical construction activities. These data are presented in **Table 14** and **Table 15**. These noise levels would diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 86 dBA measured at 50 feet from the noise source to the receptor would reduce to 80 dBA at 100 feet from the source to the receptor, and reduce by another 6 dBA to 74 dBA at 200 feet from the source to the receptor.

Table 14
Noise Ranges of Typical Construction Equipment

Construction Equipment	Noise Levels in dBA Leq at 50 feet
Front Loader	73–86
Trucks	82–95
Cranes (moveable)	75–88
Cranes (derrick)	86–89
Vibrator	68–82
Saws	72–82
Pneumatic Impact Equipment	83–88
Jackhammers	81–98
Pumps	68–72
Generators	71–83
Compressors	75–87
Concrete Mixers	75–88
Concrete Pumps	81–85
Back Hoe	73–95
Pile Driving (peaks)	95–107
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

Source: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December, 1971.

Machinery equipped with noise control devices or other noise-reducing design features does not generate the same level of noise emissions as that shown in this table.

Table 15
Typical Outdoor Construction Noise Levels

Construction Phase	Noise Level at 50 Feet with Mufflers (dBA Leq)	Noise Level at 60 Feet with Mufflers (dBA Leq)	Noise Level at 100 Feet with Mufflers (dBA Leq)	Noise Level at 200 Feet with Mufflers (dBA Leq)
Ground Clearing	82	80	76	70
Excavation/Grading	86	84	80	74
Foundations	77	75	71	65
Structural	83	81	77	71
External Finishing	86	84	80	74

Sources: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December, 1971

As shown in **Table 15**, noise levels for general construction phases (at 200 feet with mufflers) would not be expected to result in noise levels at the nearby sensitive receptor to noise levels above 74 dBA. A noise level of 74 dBA would exceed the exterior noise standards for commercial areas set by the San Diego County and City of El Cajon Noise Ordinances. However, both ordinances exempt noise sources associated with construction activities from their noise standards, provided the construction activity would be limited to the hours between 7:00 AM and 7:00 PM, Monday through Saturday. As the proposed project would be required to comply with the San Diego County and El Cajon Noise Ordinances, and construction activities would be limited to hours established; the proposed project would not result in significant impacts associated with construction.

Conclusions

The proposed project would have less-than-significant noise impacts. Alternatives A and B would generate less traffic compared to the proposed project and would also have less-than-significant noise impacts.

The proposed project and both Alternatives would have less than significant cumulative impacts. Under long-term Buildout conditions, total traffic volume growth would result in a maximum noise level increase of 1.1 dBA; however, the project's contribution (0.1 dBA) would not be cumulatively considerable. With the addition of aircraft noise, the maximum combined noise level would increase by 0.8 dBA over existing; the project's contribution would not be cumulatively considerable. Therefore, there would be no significant cumulative impacts.

The project would also involve the acquisition of property to meet federal safety requirements. The acquisition of these properties would not generate traffic and therefore would not result in an increase in noise levels in the project vicinity.